INTERNATIONAL COOPERATION ON THE SUPERCONDUCTING SUPER COLLIDER (SSC)

HEARING

BEFORE THE

SUBCOMMITTEE ON INTERNATIONAL SCIENTIFIC COOPERATION

OF THE

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES

ONE HUNDREDTH CONGRESS

FIRST SESSION

MAY 7, 1987

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**Resigned February 19, 1987 (H. Res. 89).
***Elected March 30, 1987 (H. Res. 133).

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INTERNATIONAL COOPERATION ON THE SUPERCONDUCTING SUPER COLLIDER [SSC]

THURSDAY, MAY 7, 1987

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
SUBCOMMITTEE ON INTERNATIONAL SCIENTIFIC COOPERATION,
Washington, DC.

The subcommittee met, pursuant to notice, at 1:40 p.m., in room 2325, Rayburn House Office Building, the Honorable Ralph M. Hall (chairman of the subcommittee) presiding.

Staff present: Charles E. Cooke, Technical Consultant; Robert Palmer, Staff Director; Todd Schultz, Republican Technical Consultant; and Harlan Watson, Republican Energy Coordinator.

Mr. HALL. The committee will come to order.

This will be a hearing on the international aspects of the Superconducting Super Collider. It hopefully is to be placed somewhere in deep east Texas.

Mr. SENSENBRENNER. Point of order. [Laughter.]

Mr. HALL. Sustained.

We have one problem. We have three sites there, and they are trying to get us to relegate it down to one site. But being optimistic, I hate to lose the chance of getting two Super Colliders in case they decide to double.

This is the first hearing of this subcommittee to review the international aspects of the proposed Superconducting Super Collider.

We are told that the field of high energy physics is at a stage of development which is unique, that we are probably on the threshold of discoveries that could be as important as some of those discoveries that were made in the Thirties.

Before 1932, no one really knew the composition of the atomic nucleus. In 1932 the neutron was discovered, and within 8 years our knowledge of the nuclear structure developed to what it is now.

The current situation in high energy physics compares with those times because in the last decade a number of new discoveries were made of particles that make up the proton and the neutron. And in the process, a completely new physics was discovered. Today we find ourselves in the same state of tremendous development that we found ourselves in during the Thirties with respect to nuclear science.

The importance of the knowledge to be gained, of course, cannot be overlooked, but at the same time we have to recognize that the costs of attaining the knowledge have increased dramatically. Particle accelerators have increased in size from the breadbox size cy-

clotron invented by Dr. Ernest O. Lawrence in 1930 to a proposed tunnel 52 miles in circumference and in cost from a few thousand dollars to as much as $6 billion. As the scale of these so-called "big science" projects increases, it is very clear to all of us that the balance between their national cooperation and competition in science will have to shift more in favor of greater cooperation than the less cooperation that we've known up until this time.

I believe the question of how the international physics community and interested governments will participate in the proposed SSC is probably one of the most important issues to be addressed by the Congress as it considers authorizations and appropriations for this project. In these days of record budget deficits, we have to make the extra effort to explore every possibility of foreign support for the project to reduce our government's expenditures to a minimum consistent, of course, with national security considerations.

As the lead agency charged with ascertaining the level and type of foreign participation, the Department of Energy has been asked to appear today. And they have graciously agreed to review for us their assessment process.

The subcommittee is also interested in knowing about the time schedule the DOE is operating under, the relative roles of the other federal agencies and government entities participating in this process, any concerns the department may have at this juncture about any tradeoffs that may have to be made to accommodate foreign participation and, more particularly, their views on what type of congressional and administrative commitments to the project potential foreign partners are likely to request, what they are going to ask of us.

[The prepared statement of Hon. Ralph M. Hall follows:]

OPENING STATEMENT OF THE
HON. RALPH M. HALL (D-TX)

SUBCOMMITTEE ON INTERNATIONAL SCIENTIFIC COOPERATION

Hearing on
International Aspects of the Superconducting
Super Collider (SSC)

Thursday, May 7, 1987

This is the first hearing of this Subcommittee to review the international aspects of the proposed Superconducting Super Collider.

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Before 1932, nobody knew the composition of the atomic nucleus. In 1932, the neutron was discovered, and within eight years, our knowledge of the nuclear structure developed to what it is now.

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The importance of the knowledge to be gained cannot be overlooked, but at the same time, we have to recognize that the costs of attaining this knowledge have increased dramatically. Particle accelerators have increased in size from the breadbox sized cyclotron invented by Dr. Ernest O. Lawrence in 1930 to a proposed tunnel 52 miles in circumference and in cost from a few thousand dollars to as much as $6 billion. As the scale of these so-called "big science" projects increases, it is clear to all that the balance between international cooperation and competition in science will have to shift more in favor of greater cooperation.

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The Department's witness is George J. Bradley, Jr., Principal Deputy Assistant Secretary for International Affairs. He is accompanied by Dr. James F. Decker, Acting Director of the Office of Energy Research.

Mr. HALL. At this time, we will have other opening statements. And I am very pleased to recognize Mr. Sensenbrenner.

Mr. SENSENBRENNER. Thank you very much, Mr. Chairman.

I do have an open mind over locating the Super Collider in east Texas. I am certain that we will be wined and dined with much Tex-Mex food and plenty of Rolaids as a way of convincing us that east Texas is the place to put the Super Collider.

On a serious note, the Superconducting Super Collider can either be something that can be the jewel of scientific equipment in the United States or the biggest scientific boondoggle known to mankind. Which it is depends upon how carefully this Congress and the Executive Branch agencies in charge of putting together the Super Collider proposal work in planning, in making cost estimates and in letting bids to make sure that the cost estimates do not experience a significant overrun.

What is done in the planning and the other items up front now will make the job of getting the Super Collider done and on-line much, much easier 8 to 12 years from now. And that's why I certainly do not think that we ought to go into this hastily because we have one opportunity to get the job done right. And we had better not blow it.

Now, as a result of this feeling, it seems to me that if decisions have not been made, or proposals are not ready to go to Congress for our consideration, the witnesses today should so state and keep their remarks general. I will attempt to keep my remarks general as well.

But it seems to me that since the Super Collider is going to be the one facility of its type in the world, and since foreign governments and foreign scientists are going to want to do experiments on the Super Collider, that they ought to be asked to pay for part of the construction costs. And cost sharing is going to be an essential element in terms of selling our colleagues in the Congress to authorize and appropriate the funds that are necessary to get this job done.

I frankly think that we ought to approach the idea of capital construction cost sharing with a hardball approach particularly in the area of procurement. I don't think that we should be very eager to allow foreign contractors to bid and to get contracts for the procurement and the construction of the Super Collider if their governments are unwilling to help chip in a part of the cost. These things go hand and glove and we ought to adopt a realistic standpoint, saying if you want to get some of the gravy, you ought to put up some of the dough.

Thank you very much.

Mr. HALL. Thank you, Mr. Sensenbrenner.

We recognize Mr. Fawell of Illinois, the gentleman from Illinois.

Mr. FAWELL. Yes. I have no statement, Mr. Chairman.

Mr. HALL. Mr. Boehlert of New York?

Mr. BOEHLERT. Mr. Chairman, I am vitally interested in this project. And one of the things that concerns me most is that we are being exclusive rather than inclusive. And I am anxious to develop during this proceeding today the rationale behind the steadfast position of the department not to allow any consideration of a transborder site. That disturbs me a great deal, not that I'm suggesting

that a U.S./Canadian transborder site would necessarily be the best site, but I do not think we should summarily rule it out right from the beginning.

It seems to me in an era in which we can conclude, as we just did, an agreement with the Soviet Union for a joint U.S./U.S.S.R. scientific cooperation—and last time I checked, they are not our best friends in the world—we ought to be able to look to our good friends north of the border for some consideration as we develop this big science project that is going to be one of the most costly in the history of man.

Mr. HALL. Thank you very much.

Congressman Packard of California.

Mr. PACKARD. Simply, I appreciate, Mr. Chairman, your calling this international subcommittee because I think this is going to become an international project either in its usefulness after construction or during construction. And certainly this committee ought to take a prominent role in how that is designed and what type and to what extent we want to involve our foreign partners.

Thank you, Mr. Chairman.

Mr. HALL. Thank you, Congressman Packard.

Mr. MacKay of Florida and Mr. Torricelli of New Jersey have indicated that they will reserve their questions. I certainly would recognize you at this time if you would like.

Thank you. All right. We will get along. Is there anyone else who cares to make a statement?

[No response.]

Mr. HALL. The Department's witness is George J. Bradley, Jr., who has been very generous with his time and his knowledge, as Principal Deputy Assistant Secretary of International Affairs and Energy Emergencies. He is accompanied by James B. Decker, Acting Director of the Office of Energy Research. And Mr. Bradley we welcome you and Dr. Decker to the committee.

We will be pleased to receive your statement at this time. You may summarize it. Try to keep it as brief as possible, and we will extract by question and answers from your vast knowledge. Thank you, sir.

STATEMENT OF GEORGE J. BRADLEY, JR., PRINCIPAL DEPUTY ASSISTANT SECRETARY, INTERNATIONAL AFFAIRS AND ENERGY EMERGENCIES, U.S. DEPARTMENT OF ENERGY, ACCOMPANIED BY JAMES B. DECKER, ACTING DIRECTOR, OFFICE OF ENERGY RESEARCH

Mr. BRADLEY. Thank you, Mr. Chairman and members of the subcommittee.

I am pleased to appear before the subcommittee to discuss the role of international collaboration in the Superconducting Super Collider project. Dr. James Decker, Acting Director of the Office of Energy Research, who has the program responsibility for the SSC, is joining me today.

As you are aware, on January 30, 1987, Secretary Herrington announced President Reagan's decision to support construction of the world's largest and most advanced high energy accelerator, the Superconducting Super Collider. Our reason for building the SSC is to

continue mankind's research into the fundamental nature of matter and energy. Scientists worldwide have made great progress in understanding the ultimate building blocks of matter and energy and the basic forces which govern their transformation. However, important questions remain unanswered. The SSC will help to answer these questions.

The field of high energy physics has had a long history of successful international collaboration. Currently this type of research, besides being conducted in the United States and other individual countries, is also performed extensively on an international basis. Because of the increasing complexity and enormous costs of state of the art accelerators and associated equipment, it is not practical nor desirable for several individual countries to each invest the scientific and economic resources to duplicate such experimental facilities.

In view of the worldwide scientific significance of the project and the magnitude of the effort involved in the SSC, DOE will be exploring the potential for international cost sharing on this basic research facility. This may include direct financial contributions, as well as in-kind contributions such as the supplying of equipment, experimental components, and scientific talent.

From the standpoint of international participation, the project can be viewed in three parts: the design and construction of the accelerator; detectors, and associated equipment and other R&D matters; and facility operation. We may expect the international interest and eventual commitments to proceed along separate time frames for each part of the project. We should clearly be seeking the earliest possible conclusions of negotiations on any part of the project.

Within the Department of Energy, the Office of Energy Research has the project responsibility for the overall SSC. The Office of the Assistant Secretary for International Affairs and Energy Emergencies has the responsibility for determining the degree of interest and facilitating participation of other countries in the SSC project. In these capacities, both offices report to the Under Secretary of Energy, Joseph Salgado, who Secretary Herrington has asked to oversee the overall implementation of the program, including the organization of our international collaboration efforts.

To assist the process of seeking international collaboration, I head a working group composed of representatives from the Department of State, the Office of Science and Technology Policy and the Department of Energy. In addition to regular working group meetings with these agencies and depending on the issues to be covered, we contemplate coordinating with officials from other agencies as the specific occasion or issue may warrant.

Based on the outcome of an interagency review, and after an expression of intent from Congress for the project, we intend to initiate visits to key capitals by high level teams. We would use these occasions to have an exchange of ideas with our counterparts and explore their interests in, and requirements for participation.

To date we have had preliminary and informal discussions on the project with our western allies and have received some favorable but unofficial expressions of interests. We have no plans for discussions with Eastern Bloc countries at this time.

It is vital in meeting with foreign officials that we be able to project a domestic commitment to the SSC. Other countries would have to make long-range commitments to such a project and, therefore, our commitment would also have to be long-range. We are looking for an expression of congressional intent in support of this project in order to move with reasonable confidence to secure commitments on the part of our potential partners.

I want to thank you for giving me the opportunity to talk to you about our strong interests and plans relative to the international collaboration. I look forward to meeting with you again to continue our discussions on the subject.

Mr. Chairman, that concludes my prepared statement. The Department welcomes any ideas you may have on our approach. And Dr. Decker and I stand ready to answer any questions.

[The prepared statement of Mr. George J. Bradley, Jr., follows:]

Statement of George J. Bradley, Jr.

Principal Deputy Assistant Secretary

for International Affairs and Energy Emergencies

Department of Energy

before the

House Committee on Science, Space, and Technology

Subcommittee on International Scientific Cooperation

May 7, 1987

Mr. Chairman and Members of the Subcommittee

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equipment, it is not practical nor desirable for several individual countries to each invest the scientific and economic resources to duplicate such experimental facilities.

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From the standpoint of international participation, the project can be viewed in three parts. These are (1) the design and construction of the accelerator (estimated cost of $3.2 billion in FY 88 dollars); (2) detectors and associated equipment (estimated cost of $1.2 billion in FY 88 dollars); and (3) facility operation ($270 million per year in FY 88 dollars). Because of the potentially different interests of each country, we may expect the international discussions and eventual commitments to proceed along separate time frames for each part of the project. We shall clearly be seeking the earliest possible conclusion of any negotiations for all parts of the project.

Within the Department of Energy, the Office of Energy Research has the responsibility for the overall SSC project. The Office of the Assistant Secretary for International Affairs and Energy Emergencies has the responsibility for determining the degree of interest and facilitating participation of other countries in the SSC Project. In these capacities, both offices report to the Under Secretary of Energy, Joseph Salgado, who Secretary Herrington has asked to oversee the overall implementation of the program including the organization of our international collaboration efforts.

To assist the process of seeking international collaboration, I head a working group composed of representatives from the Department of State, the Office of Science and Technology Policy and the Department of Energy. In addition to regular working group meetings with these agencies, and depending on issues to be covered, we contemplate coordinating with officials from other agencies as the specific occasion or issue may warrant.

This working group is responsible for developing an information base as well as developing strategies and recommendations on international collaboration for a senior management group, which is led by the DOE Under Secretary. Through both the working group and the senior group we are developing an action plan to obtain maximum participation from other countries.

As one of the first steps in our plan of action, we have asked the Department of State to ask our embassies in key countries to provide initial evaluations of the prospects for international collaboration between host governments and DOE. In addition, we have asked them to assist us in determining the current capabilities, key organizations, and the names of key individuals and other related information.

Based on the outcome of an interagency review and after an expression of Congressional intent for the project, we intend to initiate visits to key capitals by high level teams. We would use these occasions to have an exchange of ideas with our counterparts and explore their interest in and requirements for participation.

To date we have had preliminary and informal discussions on the project with our Western allies and have received some favorable but unofficial expressions of interest. We have no plans for discussions with Eastern Bloc countries at this time.

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of this project in order to move with reasonable confidence to secure commitments on the part of our potential partners.

I want to thank you for giving me the opportunity to talk to you about our strong interests and plans relative to international collaboration. I look forward to meeting with you again to continue our discussions on this subject.

Mr. Chairman, that concludes my prepared statement. The Department welcomes any ideas you may have on our approach in dealing with potential foreign participation. Dr. Decker and I will be pleased to answer your questions at this time.

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Mr. HALL. Thank you, Mr. Secretary. Does Dr. Decker care to make an initial statement?

Mr. DECKER. No, sir.

Mr. HALL. All right. I think Congressman Stallings, the gentleman from Idaho, has arrived since—and departed. I'm sorry. I would like to recognize you for an opening statement if you would care to make one.

Mr. STALLINGS. Thank you, Mr. Chairman. I appreciate that. I have a statement I would like added to the record.

I would just like to welcome these gentlemen here. We appreciate the work they are doing.

The thrust of my statement is just an absolute necessity for international cooperation as we put together this SSC project. I think it is incredibly important at the INEL in eastern Idaho. We have three projects there that have worked very well in terms of international cooperation. And we've seen success there. And I certainly recommend that we continue to pursue this line as we build the SSC.

Thank you, Mr. Chairman.

[The prepared statement of Hon. Richard H. Stallings follows:]

OPENING STATEMENT

THE HONORABLE RICHARD H. STALLINGS

Subcommittee on International Scientific Cooperation

May 7, 1987

The President's decision and commitment to move forward with the SSC project was welcome news to me. This important research facility would be a world center for high energy physics and help assure that America maintains its leadership role in the frontiers of science.

A working partnership and coordinated national effort between the federal government, our universities, and private industry is critical to the success of this program. I also believe that international support, involvement, and cost sharing is imperative.

Because of the enormous cost of the project, the current budget environment we live in, and the potential worldwide benefits of the project, the Department of Energy must seek cost sharing for the SSC with all interested nations.

Without international funding and support, I believe the project's future would be in serious jeopardy.

I also share the Department's belief that high energy physics has benefitted from a long history of cooperation throughout the international science community.

The expertise of our DOE laboratories, such as the Idaho National Engineering Laboratory, can and should play a major role in this exciting field.

The experience from some of our DOE laboratories has demonstrated that an international effort can be successful.

For example, several international research programs have been conducted at the Idaho National Engineering Laboratory to combine the technical expertise of the participating countries into a cooperative effort to enhance nuclear reactor safety.

Three of these programs are the Loss-of-Fluid Test (LOFT), the Severe Fuel Damage tests conducted in the Power Burst Facility, and the Three Mile Island Evaluation Programs.

Mr. Chairman, I mention these three programs to illustrate a successful partnership between the Department of Energy and various international partners.

I look forward to working with the Department of Energy and this Subcommittee on this national initiative, and I am very pleased with the progress that has been made.

This hearing today focuses on a program of international importance and offers both a great opportunity and challenge to the science and technology community.

I commend you, Mr. Chairman, for holding this hearing. I am looking forward to the testimony from our distinguished witnesses.

Mr. HALL. Thank you, sir.

Secretary Bradley, I would like to ask you: on page 3 of your testimony you describe a working group and a senior management group involved in assessing international participation, which we are all very interested in basically because of the dollars and cents involved that we hope to get some cooperation and maybe some cost sharing into it.

How many times has the working—and there is a difference between the working group and the senior management group. How many times has your working group met?

Mr. BRADLEY. The working group has met several times, three or four times.

Mr. HALL. Does it have a regular time to meet?

Mr. BRADLEY. No. It is based on the call by any one of the members or the Chair.

Mr. HALL. And sometimes, other than when they're together, different groups of them meet and discuss to build up to a meeting?

Mr. BRADLEY. Yes, Mr. Chairman. And primarily where we are at this stage, we were primarily meeting to sort of sort out how do we proceed, and to try to determine how do we go about gathering information so that we can better understand the interests that other countries might have in terms of participating in the particular project. We are organized in this way so that the Department of Energy takes the lead, since it has the responsibility for the project.

We looked around and tried to determine which departments within the U.S. government could best assist us in determining the level of interest on the parts of foreign countries. Therefore, our determination was that the Office of Science and Technology Policy in the White House and the State Department were the two agencies best positioned to assist us initially in identifying target countries and levels of interest.

Having done that, we also, as part of that initial setup of the structure, determined that other agencies who may somewhere along the process be interested in helping us assess the information as we review the information that we would then be gathering, such as the Department of Defense or Department of Commerce or the Office of Management and Budget, that we would call them to participate in the interagency meetings as appropriate.

Mr. HALL. We will be working with you and these groups. Tell the committee a little bit about the senior management group, and whether or not they meet regularly, and who participates on the senior management group, and whether or not—if you cannot give us a list now, as to whether or not you would provide us with a list of the members of that group. Would that be difficult?

Mr. BRADLEY. No, Mr. Chairman. We would be happy to do that.

[The material referred to follows:]

The senior management group is an informal group made up of Mr. Joseph F. Salgado, Under Secretary of Energy who also serves as its Chairman; Mr. W. Allen Wallis, Under Secretary of State for Economic Affairs; Dr. William Graham, Presidential Science Advisor; Ambassador John D. Negroponte, Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs; Dr. James F. Decker, Acting Director for Energy Research, Department of Energy; and Mr. David B. Waller, Assistant Secretary for International Affairs and Energy Emergencies, Department of Energy.

Mr. HALL. And have you all met? Has the senior management group met?

Mr. BRADLEY. Well, there have been a few meetings of that group. Again, it is sort of on an informal basis. Under Secretary Salgado chairs the group. Dr. Graham participated in some meetings, as well as Ambassador Negroponte from the State Department, and Dr. Decker and his predecessor, Dr. Trivelpiece, and Assistant Secretary David Waller, were the members.

Mr. HALL. I just have this last question. You state on page 2 of your testimony that it is not practical or desirable for several individual countries to each invest the scientific and economic resources to duplicate experimental facilities. Yet, an advisory committee to CERN recently supported a plan to construct a new European accelerator which would be competitive with the SSC.

What is your assessment of the desire in Europe and who in Europe, their desire and their will to go ahead with the LEP, for example?

Mr. BRADLEY. Well, I certainly don't want to speak for Europe.

Mr. HALL. But the desire you have gleaned from them through your meetings or from your associates.

Mr. BRADLEY. But Mr. Chairman, I can say that there certainly is interest on the part of the Europeans in talking with us. At least our indications on an informal basis have been that there is interest in Europe in terms of summit countries in participating in the U.S. project.

Mr. HALL. I will come back to you with a question in a minute. I think it is only fair to recognize Mr. Sensenbrenner, the ranking minority.

Mr. SENSENBRENNER. Thank you very much. I would like to follow up on the line of questioning Mr. Hall has.

And Secretary Bradley, on page 4 you have noted that U.S. embassies in key countries are providing "initial evaluations of the prospects for international collaboration between host governments and DOE." And who are our embassy personnel contacting there? Energy agencies, cabinet officials, parliamentarians, ministers? Who?

Mr. BRADLEY. I guess the simple answer is all of the above. What we have asked them to do is really identify who are the key decision makers within the foreign countries who would be part of the process to determine participation in such a project, and having then identified those key decision makers, to try to determine informally their level of interest.

Mr. SENSENBRENNER. Have the decision makers been approached yet?

Mr. BRADLEY. In some cases some of the decision makers have been approached. We are not comfortable or confident at this stage, which is an early stage, that we do not feel that all of the decision makers have been identified. We don't feel that we have a clear picture in any given country in terms of who the decision makers would be.

Mr. SENSENBRENNER. When this subcommittee and others had hearings on the SSC before the Easter recess, the European scientists who have testified were not singing hallelujahs about the construction of the SSC. Part of that I think was due to the fact that

they have got their own projects. But I am certain that these people would have a much better ear of those government officials who do making funding questions than we would have.

How do you interpret the criticism and the statements by the European scientists that you don't need to have an SSC to do the interesting research on the cost sharing question?

Mr. BRADLEY. Well, I think again, you know, not trying to second guess our European friends, but certainly there are institutional interests involved when it comes to CERN, and in insuring that that institution continues to exist, and that the money flows that are flowing into the various member countries who are part of CERN, that that money continues to flow within those particular countries. And so that, therefore, the countries who are members of that institution would certainly hope that whatever project we are pursuing here does not in any way adversely affect their effort there.

Mr. SENSENBRENNER. Well, Mr. Chairman, in order to make the record complete in this, I would ask unanimous consent that the record include an article from the current issue of the Scientist called "Europe Balks at Support for Collider."

Mr. HALL. Without objection, it will be included.

[The article from the Scientist follows:]

Europe Balks At Support For Collider

BY THERESE LLOYD

WASHINGTON—European scientists testifying before a House committee have thrown cold water on the prospect of international collaboration on the Superconducting Supercollider, a possibility that the Reagan administration has held out as a way to reduce the U.S. cost of the proposed multi-billion dollar project.

In three days of hearings last month by the Science, Technology and Space Committee, a stream of witnesses also expressed doubts about the value of recently discovered superconductive materials in the design of the project and concern about the short timetable for site selection and the massive project's impact on the rest of science and the federal deficit.

Herwig Schopper, director-general of CERN, provided a grim scenario for the SSC based on a scarcity of funds available for science in Europe. "If we would propose such a project of that size, it would not go through because the emphasis [in Europe] is on cost-efficiency and cost-effectiveness," he said.

Schopper advocated a less energetic hadron, or proton, collider reaching about 9 TeV in each beam to sit above the ring of magnets for CERN's Large Electron-Positron (LEP)

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SSC

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collider, a circular electron accelerator slated to begin operation in early 1989. "The hadron collider in the LEP tunnel would cover the interesting energy range at a fraction of the projected cost of the SSC," he said.

Committee members seemed stunned at Schopper's suggestion of a European substitute for the SSC, and asked repeatedly if he felt the United States should defer the SSC until after completion of a proton collider at CERN. Schopper said he simply believed that any new particle facility should make use of existing resources.

Nicola Cabibbo, president of the Italian National Institute for Nuclear Physics, explained how Italy's high-energy physics research is funded with five-year plans. Discussions now under way for the period 1989 through 1993 include renewed support for the Gran Sasso National Laboratory, CERN, and a proton-electron machine at the DESY accelerator in West Germany. Italy will provide one-half of the superconducting dipole magnets for the project, known as HERA, a commitment that reduces its interest in the SSC.

Noticeably absent from the hearings were scientific representatives from Japan, the country said by administration officials to be most likely to collaborate on the SSC. "They were invited and did not want to testify," said John Dugan, staff director of the House Subcommittee on Energy Research and Development. A consultant to the subcommittee said the trade war on imported microchips kept Japanese scientists away..

Advantage to Japan

But Japan dominated discussion about industrial links with the SSC that would facilitate the transfer of spinoff technologies. Allowing Japan to supply superconducting magnets to the SSC "would be extremely dangerous to a fledgling American industry," said Carl Rosner, chairman and president of Intermagnetics General Corporation (IGC). Rosner said international contributions of equipment and materials should "be accompanied by a much larger cash contribution, as well as a reciprocal arrangement that U.S. components have equally free access to Japan and the European countries."

Rep. Don Ritter (R-Pa.) predicted that Japan would make first use of the latest superconducting developments because funds for the SSC will impoverish research in areas such as supercomputers and microchips. "We are going to end up putting $4.5 billion, three times the National Science Foundation's budget, into what is essentially a large construction project," he said. There was consensus from an industrial panel representing Martin Marietta, IGC, Air Products and Chemical Inc. and Ansaldo, an Italian manufacturer of magnets, that it would take at least 10 years to utilize newly discovered materials in the SSC.

Rep. Tim Valentine (D-N.C.) challenged Alvin Trivelpiece, outgoing DOE director of energy research, to maintain the "perception of fairness" of the site selection process by extending to the end of the year the August 3 deadline for site proposals. "It is quite obvious that some of the political subdivisions in the country don't want the time extended because they are well along with their plans," he said. The House committee is still wrestling with the issue of whether to request such an extension. A bidders' conference held by the Energy Department April 29 gave states another opportunity to express their dissatisfaction with the scheduled timetable.

Committee chairman Robert Roe (D-N.J.) criticized the Energy Department for sandwiching the environmental impact statement for the SSC between the July 1988 selection of the preferred site and the December announcement of the winning location. "That is a critically important issue and should not be put off until the tail end of the process," Roe said. ■

Lloyd is a freelance science writer in Vienna, Va.

Mr. SENSENBRENNER. And I would like to make one final observation. It seems to me, Secretary Bradley, from the thrust of your testimony that you think that the commitment from the Congress to go ahead with constructing the SSC has to be done before we get cost sharing commitments from other countries that might either want to bid on the construction or have their scientists use it once it is complete and functional.

I would like to say from this member's viewpoint, that in my opinion in order to get Congress to make the commitment to spend all this money to build the SSC, the cost sharing commitments from the other countries has to come at the same time rather than us putting the money up front and asking them to make contributions as their generosity may or may not allow them to do. It has to be contemporaneous; otherwise, I think this is a dead duck in the Congress.

Thank you.

Mr. HALL. Thank you.

One gentleman that I overlooked that is not a member of the subcommittee, but is a member of the big committee of Science, Space and Technology, a scientist, chemist, metallurgist, knowledgeable. Congressman Ritter, do you want to put an opening statement in the record? Or have I done it for you already?

Mr. RITTER. Thank you, Mr. Chairman. I just appreciate the opportunity to be here and to listen, and perhaps at a later time participate.

Mr. HALL. Welcome to the subcommittee. We still have room for you if you decide to add this.

Mr. RITTER. With such a delightful chairman, I am really tempted to do it.

Mr. HALL. I recognize the gentleman, Mr. MacKay.

Mr. MACKAY. Thank you, Mr. Chairman. I would like to explore with you the question of what kind of negotiations would be carried on. It seems to me the Department of Energy has several projects that could appropriately be international projects. NASA has at least one that we are talking about the possibility of it being international. And DOD has got one where they have already contracted. I am talking about the fusion program,which is in your agency, the space station, a lot of the weather research expenditures that are in NASA, and the SDI that is in the Department of Defense.

If I were, say, Germany or Japan, and I knew all of these were out there, and you were coming to me and saying, why don't you participate in this one that is going to be in my country, then I would probably say to you, fine. What about you participating in one of the others that is going to be in my country?

What I am saying is do you really see us able to negotiate these one at a time? Or is any thought being given to the idea that maybe we really ought to look at all of these big science projects in an international context? What thought have you given, and what is the policy, if any, of your agency or the Reagan Administration?

Mr. BRADLEY. Thank you. I appreciate the opportunity to answer that question.

A lot of thought is given to that just along those lines, indeed. In the first instance, as it relates to the Department of Energy, of

course, there are a number of, as you said, other projects in addition to fusion, also a breeder and other things. In our internal working group we, of course, take into account all of the other leverage that we might possibly have as we contemplate discussions and ultimately negotiations.

Also, as we participate in the interagency environment, the interagency group, clearly one of the things and one of the considerations we have as we select those people who participate with us, is to have a broad enough representation so that we cover in our considerations the full range of other possibilities. So, I think that we, as part of the process, automatically take into account all other possibilities. But because of the way, quite often, to be honest about it, that the scientific community is structured, quite often you cannot necessarily make these tradeoffs.

The United States I think has been, you know, with both the Executive Branch and the Congress—the leadership—has been in the forefront of pushing for an international R&D policy that takes into account the points that you have just raised.

Mr. MACKAY. Mr. Chairman, if I might pursue this a little further.

My understanding is that there used to be a group established for the purpose of discussing science and technology as part of the annual economic summits, but that group has been disbanded. It sounds to me as if the Administration does not have this as a priority or that it does not have a policy that would allow us to really negotiate the question of if you all help on this, we will help on another one that is going on in another country.

Mr. BRADLEY. A couple of things. And again, I think the point you raise is a very good one. We have been, in the Department of Energy, taking really the lead—one of the leading agencies within the Executive Branch, Dr. Decker and others, in pushing very strongly, first of all, within the—as you said, the summit context. Because I think if one looks back, one will see that in each annual summit we pushed for a policy statement by heads of state for greater international R&D collaboration recognizing the need to avoid duplication of effort, just the points you've made.

I think that coming out—as you also recall in the Versailles Summit in 1983, there was a statement by heads of state and a working group set up to look at, indeed, scientific efforts. One of the working groups was high energy physics, which Dr. Trivelpiece chaired from the Department of Energy, which really provided the forum within which the international scientific community could begin to work together in developing a program and plans relative to the SSC and other similar projects. Also, within that same setting, that same process was used to begin to look at possible ways of collaboration across a broad spectrum of science and technology. We were in the forefront of that and pushing for that.

In addition to that, we have also pushed very strongly within the 21 member nations of the OECD/IEA for a greater international collaboration and for a consideration across the board of ways of reducing the cost to the individual nations. And we will be pushing again this year in the IEA ministerial meetings.

So, I think it is fair to say that we feel that it is important to make these kinds of tradeoffs, and every opportunity we get, we push for it.

Mr. HALL. Let me break in there.

Congressman Stallings has gone to vote, and will come back and chair while we go to vote. We are under vote. Now, for any of you who want to go vote then come back, we are going to continue the hearing. We are not going break the hearing and then come back. So, if any of you want to vote, these gentlemen will still be here when you get back.

Mr. RITTER. Mr. Chairman, if I might just interject, Mr. MacKay and I have prepared a "Dear Colleague" that is quite relevant to the Superconducting Super Collider, and it is on the table. As I understand it, copies are available for our fellow members and for other members of the audience who may be interested.

Mr. MACKAY. Mr. Chairman, if I might just ask one more question.

Mr. HALL. Sure. The Chair recognizes the gentleman from Florida.

Mr. MACKAY. I understand that there is an economic summit meeting in Venice in June of 1987. Is this international or proposal for international cooperation on that agenda for that summit?

Mr. BRADLEY. I think it is fair to say that we in the Department of Energy feel that it ought to be. We have argued within the Executive Branch for an inclusion and consideration of it on the Venice Summit.

I think it is also fair to say that at this point it is not on the agenda.

Mr. MACKAY. Well, then are you saying that your department does not reflect the view of the Administration on the question of international cooperation?

Mr. BRADLEY. No. I think what I'm saying is that the—you know, we are still—as far as the summit is concerned, there are still discussions, ongoing discussions, in attempting to shape the agenda. That process has not been completed yet.

Mr. MACKAY. I see. Thank you, Mr. Chairman.

Mr. HALL. We have Mr. Nelson Milder of Congresswoman Lloyd's office here too. And you may have questions that she wanted you to submit. If you do, we will certainly put them in the record.

I think just to follow up on what Mr. MacKay had asked you, whether or not it would make sense for the United States to support the upgraded Geneva operation, the LEP operation, in return for some kind of promise from them to support our next generation SSC in the United States in 10 to 20 years. That seems like that makes some sense to me. Does it to you?

Mr. BRADLEY. I'll answer the international relations question. Jim, you might want to answer the science question. On the international relations side, I guess what I would say is that based on what I have seen so far, I mean, I think that there is a significant interest on the part of a number of European countries to become involved with the U.S. project. They are extremely excited about it.

I think that based on what I am hearing on an informal and unofficial basis, they feel that there is no question mark in terms of this particular machine being the next generation and pushing

beyond that threshold; whereas I think when you deal with the European machine, there is a question mark in terms of whether or not it really will provide the energy that is needed.

So, I detect in some of our unofficial soundings a lot more excitement and interest in terms of the U.S. machine, but I will defer to my colleague.

Mr. DECKER. What George says I think is quite accurate, that a lot of thought went into what should be the energy of the next machine to insure that we get at the interesting physics that is out there. After considerable consideration, we settled on 20 TEV for that energy. The proposed machine in Europe cannot get close to that energy. I can't remember exactly what the possibilities are, but I think it is only like a third of the proposed SSC energy. Even at a third of the SSC energy, the technology requirements for the magnets and so forth to go in the existing tunnel at CERN are very demanding, and I think, generally, concern a quite high risk.

Mr. HALL. I guess the next question—and I don't want to put anybody on the spot, but how are we viewed internationally in terms of our record on long-term cooperation maybe in basic scientific research? Is that too tough a question? If it is, I'll withdraw it.

Mr. BRADLEY. Well that's an international relations question. But I think maybe my colleague ought to answer it.

Mr. HALL. You yield to Dr. Decker? [Laughter.]

Mr. BRADLEY. I would hope that the Chairman would allow me to speak with all candor in the hopes of providing useful information. I really think that my experience clearly demonstrates that a number of these countries or a number of our partners are concerned. They are concerned from the standpoint of concluding that quite often if they go into a venture with us that they cannot be certain that four, five years down the road we might not change direction. The concern is because usually when they go into a project of this nature, as is evidenced by the creation of such institutions as CERN, that they see it as a long-term venture and a stable environment, a business effort, that will result in the creation of an infrastructure and a number of jobs related to that particular project.

Mr. HALL. We are going to have to recess. I have got about three minutes to get over there. When the Congressman gets back, he will take up and try to waste as little of your time as possible.

[Recess.]

Mr. STALLINGS. Proceed. Mr. Hall is on his way to vote. I have done so. We can keep this going without any further delay.

I have a question that I would like you to address, Mr. Bradley. There are several possible approaches to international cost sharing on the SSC. One would be direct contributions to construction costs. Another would be assessment of user fees to cover some of the capital and operating costs. A third would be assessment of user fees to cover only operating costs.

What are the pros and cons of these various approaches, and what do you view as the preferred method of international cost sharing?

Mr. BRADLEY. I think the way we are approaching this is really to approach it with an open mind. We see it as any other business venture where you go in and you get the best deal for the Ameri-

can people. So, what we would like to do is try to determine what level of interest exists in these other countries, what are they willing to come forward with, looking at it from the standpoint of the U.S. interest, to then determine the specifics of any individual deal. So, rather than determining the specifics first, we are starting out with a bottom line that says let's maximize. Let's get the maximum contribution and without giving up U.S. control in this project.

Mr. STALLINGS. Now, if international cost sharing does not prove feasible, will foreign companies be permitted to bid on the SSC procurement? Do you envision limits on foreign contact in the SSC? And finally, should procurement of certain key components, for example the magnets, be open only to U.S. contractors?

Mr. BRADLEY. I think at this stage we are really—you know, other than insuring adherence to the law—you know, things like the Buy American Act and also concerns over technology transfer and these sorts of things—other than insuring that we are in adherence with all of the legal requirements, we are not taking any additional steps at this time. I think we are cautious of the need to insure that U.S. manufacturers, especially in key areas, remain viable, and that every opportunity is given to those manufacturers. I think as we get toward the back end and deals become clearer, then that kind of consideration will become more important. We will be clearer in terms of the criteria we will use to judge.

Mr. STALLINGS. Let me follow up then. To what extent have U.S. contractors been allowed to bid for parts or components of the accelerators now being constructed in Europe and Japan? For example, the large electron positron collider LEP at CERN in Geneva or the Tristan in Japan?

Dr. DECKER. I don't offhand know the answer to that. We will supply an answer for the record.

[The material referred to follows:]

BIDS ON FOREIGN ACCELERATOR COMPONENTS

CERN's "General Conditions Governing Invitations to Tender and Tenders" states that as a general rule invitation to tender shall be issued to manufacturers or contractors established in the territory of Member States of CERN and normally U.S. companies are not intitially invited to bid. However, when U.S. companies have exceptional goods or capabilities they are often invited to bid and significant contracts have been awarded in radiofrequency (RF) equipment, high speed electronic equipment, and computing equipment from smaller on-line hardware to the largest and fastest supercomputer. Also, if CERN receives no more than one responsive bid from CERN member states, it is required to approach manufacturers or contractors in non-member states.

All procurement by the KEK laboratory in Japan, in excess of 30–40 million yen (cost floor varies from fiscal year to fiscal year) is required to undergo international bidding via publication in the Official Bulletin of Japan. There has been significant purchasing from the U.S. by KEK, especially electronics (LeCroy) and computers (DEC).

Mr. STALLINGS. We would be very interested in that because as we are talking about international cooperation, obviously we are going to expect them to be participating. And if it gets into some bidding, and we give some contracts to them while they are, at the same time, denying contracts to American companies, that would be I think a great injustice. So, thank you. I would appreciate information on that.

What are the respective roles of the DOE, the Department of Defense, the Department of State and the Office of Science and Technology Policy in the international aspects of the SSC?

Mr. BRADLEY. Well, the Department of Energy has overall responsibility for the SSC project. The other agencies that you've identified are assisting the Department of Energy in moving forward to carry out the President's and the Secretary of Energy's directive in this area.

We would see it in terms of, for example, the Department of State assisting us in making contacts with foreign countries. We would see the Office of Science and Technology Policy in terms of helping us determine and insure that as we move forward, that our individual effort is consistent with the overall Administration's policy on science and technology.

And of course, the Department of Defense—we would look to them to help us insure that whatever agreements we might be concluding do not result in the transfer of any kind of military technology.

Mr. STALLINGS. Are we leaving out some agencies? Are there some other agencies that I have not listed that will be involved in this project?

Mr. BRADLEY. Yes. Depending on the circumstance, we would consult any and all executive branches that might have to some degree an interest in the particular action we are taking at any given point in time. For example, if it results in somehow the export of or the access to certain kinds of computer technology, given the Department of Commerce's role in that, they would be included. So it depends on the specific action we are taking. At this time we only see two other agencies having a direct interest in assisting us in the information gathering stage, and that is the Office of Science and Technology Policy and the Department of State.

Mr. STALLINGS. I would like to recognize my colleague, Mr. Fawell. Congressman, do you have any questions of these witnesses?

Mr. FAWELL. Yes, I do.

My first question is along the lines which Congressman Sensenbrenner had, and that is in regard to the international—whether DOE actually believes that there will be international cooperation. In page 4 of your statement, Dr. Bradley, you indicated that "Based on the outcome of an interagency review and after an expression of congressional intent for the project, we intend to initiate visits to key capitals by high level teams."

It seems to me as Congressman Sensenbrenner indicated that as one who does believe that America ought to accept this challenge—though I hesitate sometimes to say so because I come from Illinois, and people might think I am biased because undoubtedly Illinois is the place where it should be.

But it seems to me that money obviously is a big question, and other people are rightly concerned about other energy projects, et cetera. And we have space programs that need money, et cetera, et cetera, so that if we are going to definitely seek international cooperation and funding, I think it would be helpful if DOE could make that very clear, and although I know you cannot come up with dollars and cents, perhaps even in terms of percentages of the total

cost so that nobody is laboring under the assumption that it is going to cost the full amount, whether it is $6 billion or over the 10 year period, $8 billion, or whatever it is. Anything we can do to make it clear what the net cost will be I think will be very, very helpful.

So, my question is, is it possible that the Department of Energy can come out and be much clearer about the fact yes, there will be international funding here. We cannot give you the exact amount. But I think Dr. Trivelpiece at one time said he thought at least 20 percent. I was hopeful it would be more than that. How about that?

And I think expressions like this from the Department of Energy can be very helpful, and I know that Secretary Herrington and the whole DOE is very much in favor of this exciting concept.

Mr. BRADLEY. Yes, we really are. Having joined the Department at Argonne, I would just like to get it on the record before I answer the question.

I think those of us who are working in the international community sort of feel that it is important to position ourselves in the best negotiating position, and that we should avoid—in order to strengthen our hand—the actual identification of a certain amount of funding as being ideal and simply seek maximum contributions with no threshold. We feel that in pursuing it this way that other—and also not indicating whether we are talking in-kind—i.e., equipment or whatever—that we really leave the door open for those countries who are extremely excited about this project to convince their leaders that they ought to participate. And you give them more flexibility as they are talking about the issue from their side.

I do not know what Dr. Decker thinks about the issue, but I certainly think from the international side that is how we see it.

Mr. FAWELL. Dr. Decker, do you have something to add to that?

Dr. DECKER. No. I don't think I have anything to add to what George has already said.

Mr. FAWELL. May I still push ahead a wee bit more?

Is it possible though that DOE can make it fairly clear that—or perhaps one can say that you already have—there will be international funding, either cash and/or in-kind contributions, of a significant nature? Is that fair to say?

Mr. BRADLEY. Well, I do not know if the Department can say given the fact that we really cannot speak for the other countries, but I——

Mr. FAWELL. No. I understand that.

Mr. BRADLEY. I think that on a personal——

Mr. FAWELL. This is merely the opinion of DOE obviously.

Mr. BRADLEY. I think on a personal basis that my assessment would be that there is a lot of excitement out there and that there will be a great deal of participation on the part of other countries. But I think that that's the guess. I think that there is a lot of excitement.

On the other hand, I don't think that this will be an easy road. There are longstanding institutional relationships, and I think that as the various countries position themselves in this process, they have to have a degree of certainty especially if they move in a new direction that would decouple them from longstanding relation-

ships. So that we have got to inch forward in a way that we create a degree of certainty for them.

Mr. FAWELL. I think I certainly do understand what you are saying. I guess I am worrying more about convincing Congress than making it easier for the other nations to possibly be involved because I am so much aware, as we all are, of the debt and the ever-growing deficit. No matter what we seem to do, it always seems to get larger. And the legitimate concerns of other areas of science of well, what is going to happen to me then.

May I ask just this one other question then? And it is rather a broad one. In terms of international cooperation, what are the pros and cons which you hear and/or see in reference to that question? I imagine there are some who may oppose it. What would you say are the pros and cons? And you might add the scientific community also. Maybe this question was asked in my absence. If so, I apologize.

Mr. BRADLEY. I mean, I got to tell you. I mean, this is one area where you really don't encounter a heck of a lot of opposition to international collaboration. You know, there is probably more participation in this area of science than any other. And so, there's a little on the margins, a little maybe concern, not high level noise. You know, ask the question: Will we have any tech transfer problems and this sort of thing? But I think that even that is not that loud, and the reason being is because a number of the Eastern Bloc countries have participated internationally in this science, in CERN for example; and also given the fact that normally in this area you don't think of the transfer of a lot of sensitive technology; and then finally, because the way we are approaching it from the standpoint of the SSC, we are not initially talking to the Eastern Bloc countries.

Mr. FAWELL. Fine. Thank you very much.

Mr. STALLINGS. Mr. Boehlert, do you have any questions?

Mr. BOEHLERT. I do, Mr. Chairman.

When drafting the site selection criteria, did the Department consider that a transborder site could be a very direct and effective way of encouraging international and particularly Canadian participation?

Dr. DECKER. We structured the ISP and the whole site selection process. We tried to do it in a way that would create a level playing field for all of the states that wanted to propose. We, of course, are involving the National Academy of Sciences and Engineering as part of the proposal evaluation process and so forth.

It was felt that allowing a transborder site would provide sort of an unfair advantage to states that either had a northern—on the northern border of the country or on the southern border of the country. And for that reason—that was certainly one of the strong reasons for keeping a total U.S. site.

Mr. BOEHLERT. With all due respect, that's a bunch of unmitigated nonsense. I mean, what about providing the advantage to the American taxpayers? We are talking about a project that is going to be anywhere from $4 billion and a half to $6 billion. And if a transborder site with the Canadians could be considered—and I'm not saying you should accept it, but wouldn't it be rather attractive

to think in terms of someone else sharing the cost of this big ticket item?

Dr. DECKER. We certainly are very interested in international collaboration as has come out in this hearing. I think most of the conversations that we have had in the past with various foreign countries who are potential substantial contributors to this project have not suggested that their contributions would depend upon the location of the machine within the United States.

Mr. BOEHLERT. But then your whole reason for specifically ruling out a transborder site is, to borrow the phrase from the other debates going on in this town, to provide a level playing field. That's the whole reason. No national security interest involved.

Dr. DECKER. I am not sure that there was a national security consideration.

Mr. BRADLEY. I think that we would certainly have to take that into account. I just wanted to add that for the record. I mean, I don't think in this particular case there would have been a great deal of concern obviously, given our relationships. But certainly one would take that into account.

Mr. BOEHLERT. Are you going to discuss this question of siting with our friends to the north, with the Canadian government?

Mr. BRADLEY. We will be discussing this whole effort with the Canadians, yes.

Mr. BOEHLERT. And are you telling me that you have completely ruled out never more to revisit the possibility of a transborder site?

Dr. DECKER. Yes.

Mr. BOEHLERT. That is the official Administration position based upon your desire to have a level playing field.

Dr. DECKER. We plan to follow what we have laid out in the ISP as our site selection process and our criteria.

Mr. BOEHLERT. After the blue ribbon panel has selected its five or six sites and recommends those sites to the Department, what will be the criteria for choosing the preferred site?

Dr. DECKER. It is the same criteria that were laid out in the ISP.

Mr. BOEHLERT. And how will you weigh in the potential for international cooperation?

Dr. DECKER. I think we make a statement in the ISP about international cooperation. I can't remember exactly what was said in there. Again, it has been our feeling that the subject of international cooperation will be one of discussions between our Federal Government and the federal governments of the potential partners. And that will be separate pretty much from the site selection process.

Mr. BOEHLERT. I can sense you are going to have some problems. And they are developing, and they are developing slowly. But they are developing I think because of the very arbitrary nature in which this whole project is being advanced by the Administration, for example, arbitrarily ruling out a transborder site.

I am not suggesting that a transborder site would be the best, but I think you ought to consider it. Telling us that we have to make the commitment in Congress before we know what commitment we are going to have from our potential partners, you have got a lot of problems facing it and you have got some very thoughtful members of this subcommittee, Mr. MacKay and Mr. Ritter,

who have addressed an area of particular concern, that is, that we will be spending a good deal of our national treasury on one project to the detriment of other important scientific projects. So, I would suggest in the strongest terms I know how to be a little more flexible, a little more open-minded about such things as a transborder site.

One last question, if I may, Mr. Chairman. You indicated that if everything goes according to your plan, you do get the approval, you proceed with the development, there will be operational costs in the area of $270 million a year. And whose costs will they be? They will be our government's costs, right, if we are a single venturer?

Dr. DECKER. If we were a single venturer, yes, although I would expect that at the time SSC is completed in terms of its construction, that other U.S. facilities will likely be winding down in terms of their operation. They will not be as scientifically productive as they are now. So, I would expect some shift of operating funds. So, I don't see that $270 million as totally new funds.

Mr. BOEHLERT. This is my last question because there are others. Do you have a guesstimate on how much of that $270 million will be energy costs?

Dr. DECKER. The energy costs—I don't know that number offhand, but I would be glad to supply it to you.

Mr. BOEHLERT. I would like to have that for the record.

[The material referred to follows:]

ENERGY COSTS—SSC

The estimated power cost for operation of the SSC Laboratory is $45 million per year ($50 per MW hour), and is included in the $270 million (fiscal year 1988 dollars) of total annual SSC costs.

Mr. BOEHLERT. And I have a few more questions, Mr. Chairman for the record. It would be unfair for me to monopolize that, but I know where there is some cheap energy available. The potential partner north of the border. [Additional questions for the record submitted by Mr. Sensenbrenner appear in appendix, p. 37, with responses from Department of Energy.]

Mr. STALLINGS. Thank you, Mr. Boehlert.

Mr. Packard.

Mr. PACKARD. Thank you, Mr. Chairman.

There have been questions around and in your testimony, Mr. Bradley. There was some brief allusion to our security issues. I am interested if you perceive that there are security concerns as it relates to the SSC. Do you perceive or see any portion of the project, either in construction or after its functioning and we invite international participation, where security measures or security issues would become a consideration?

Mr. BRADLEY. At this time because we are planning on discussing and interacting primarily with the summit countries, primarily being our major partners, and given the fact that institutionally we intend to have an ongoing review process to look at any introduction of new players, I don't think we see any problems from the technology——

Mr. PACKARD. Let me carry that just one step further. "We have no plans for discussions with Eastern Bloc countries at this time"

was in your testimony. Do you see information that could come out of an operating SSC after construction where it would preclude us or there would be advisability in classifying information or some of the operations of the plant?

Mr. BRADLEY. No, sir.

Mr. PACKARD. Thank you.

Would in your judgment the timetable be affected by foreign participation in the construction, the site selection and the letting out of bids and the actual construction phasing of the project? Would that be affected by international considerations?

Mr. BRADLEY. I don't think so, sir, but I will defer to my colleague on that.

Dr. DECKER. I don't see it affecting it, but I am not sure I can fully anticipate that.

Mr. PACKARD. If this was a solely built facility by the United States Government and industry and all of the other players in it within the country, on what basis then would you anticipate international participation as an operating facility?

Dr. DECKER. Well, in high energy physics it has been traditional to have many countries participate in the building and operation of the big detectors that are required to obtain the experimental results from these experiments. So, that is another area of potential collaboration with other countries beyond contributions to the construction, equipment, and so forth.

Mr. PACKARD. If we are successful in getting international participation financially in the construction of the project, what preferential treatment did you foresee that these countries would receive in participating in the use of the facility?

Dr. DECKER. I think, interestingly enough, that in the accelerators that exist those contributions have not led to preferential treatment in terms of experimental time, that the experimental time has been determined on the basis of merit of the scientific projects that have been proposed. Whether the situation will be different here because some countries may make very large contributions, I cannot anticipate that right now. I think we have to approach these countries and see what their interests are, what they might propose in terms of quid pro quos.

Mr. PACKARD. One last question, Mr. Chairman, if I may.

If this is determined to be built without international financial participation, do you have a feeling or a recommendation as to whether and under what circumstances international competitive bidding on some of the hardware would be permitted?

Dr. DECKER. I haven't really thought that through. I guess that if we follow normal procurement practices as they exist now, one would apply "Buy America." That often is not enough to overcome very low bids that we see from foreign manufacturers.

Mr. PACKARD. So, what are you telling me?

Dr. DECKER. If we were to go ahead and use present procurement practices, then foreign manufacturers would not be forbidden from competing for our equipment in construction.

Mr. PACKARD. Do you think it would be on a straight bid basis under those circumstances then that they would be low bidder?

Dr. DECKER. Yes, sir.

Mr. PACKARD. Thank you, Mr. Chairman.

Mr. STALLINGS. Thank you, Mr. Packard.

Let me ask one other question. Can you cite any examples of projects where there has been an effective and successful partnership between the Department of Energy, including the national laboratories in other countries, that can serve as a model for international cooperation on this SSC?

Dr. DECKER. I think we have had some on a smaller scale. For example, we had the large coil test facility down at Oak Ridge National Laboratory where three of the large superconducting magnet coils were supplied by other countries. One was supplied by Japan. One was supplied by the European Community, and Switzerland was the other supplier. That project came off quite well. That is one that I can think of.

Mr. BRADLEY. Yes, I think that is right. Certainly on the level of science and technology collaboration on that level, I mean, there is good experience. I think on the institutional level, because of the large size of this project, maybe we will be breaking some new ground. And I think we are approaching it again from the standpoint of an open mind and trying to come up with the best deal and the best arrangement.

Dr. DECKER. We have also had some other very successful collaborations with the Japanese government in fusion research. They made a substantial contribution to the Doublet III Tokamak experiment at G.A. Technologies, and they have made contributions to other U.S. facilities as well. Those have been very successful.

Mr. STALLINGS. Mr. Hall?

Mr. HALL. Yes. I will ask a question that has been submitted through Congresswoman Lloyd's office that they wanted an answer to. And that is, if we receive no positive response from foreign governments after exhausting all the possible channels, do you see the DOE changing any of its scope or emphasis on SSC?

We just draw a blank from them.

Dr. DECKER. Well, it is certainly a possibility I suppose that we would make a change.

Mr. HALL. Is that all it is?

Dr. DECKER. We have not addressed that possibility. We feel very confident that we will get substantial foreign contributions to this project.

Mr. HALL. On page 4 you indicate that you don't have any plans for discussion with the Eastern Bloc countries at this time. And by adding the words "at this time," I presume you are kind of holding them in abeyance, or do you foresee or intend to contact them at a later time? Is there any gold to be mined there? Just generally describe the level of performance of Eastern Bloc accelerators, both the current and any that they have on the drawing board or planned, if you would just briefly.

Mr. BRADLEY. Well, let me answer the first part, and then I will turn to my colleague for an answer on accelerator performance.

But in terms of the way we are approaching the Eastern Bloc countries, relative to their participation, we are drawing a playing field. And we are saying that in that playing field it's the summit countries and the United States. The Eastern Bloc countries are outside of that playing field, but the gate is still open for them to enter. But in order for them to get through that gate, those propo-

nents are going to have to convince the gatekeeper that they ought to be in there. And that is really the way we are trying to approach this thing on the accelerator.

Dr. DECKER. The Soviets have had a very active high energy physics program. Their accelerator capabilities have lagged somewhat behind those of Western Europe and the United States. They do have under construction an accelerator which is designed to produce energies about three times those that are now achieved at FermiLab. I do not know what the completion date is projected to be.

Mr. HALL. Good. I'll also ask—the gentleman from New York I think raised a very good question and through his question posed a pretty good position on the transborder site. And of course, those of us in the southern part of the United States would be interested in that too. It really makes sense, first, in that Canada is a very close ally of ours though they are out-trading the heck out of us lumberwise and in some other ways. But still there is a closeness there that we are North Americans. And the same thing goes for Mexico, a very close neighbor and a very needy neighbor with energy. And I was thinking not along the Canadian border, but maybe along the Rio Grande somewhere or even southern New Mexico or Arizona, even California.

You will still apply those same—you have a list and a scale of requisites that you take into consideration before they narrow it down to one state or one location. And I am not asking you for an answer at this time. It wouldn't be fair to. You probably could not give it to me if it were fair.

But that makes a lot of sense—a transborder for this hemisphere and for the balance of trade with both countries.

Mr. BOEHLERT. Mr. Chairman, if I may, if you will yield a moment.

Mr. HALL. I surely will.

Mr. BOEHLERT. I was just two weeks ago in the Soviet Union in Moscow when Secretary of State Shultz and Foreign Minister Shevardnadze, with smiles on their face, signed an agreement for international scientific cooperation. And the Speaker was the head of our delegation, and it was a bipartisan delegation. And we were all very happy about that. Instead of talking and concentrating our energies on our areas of difference, we were working cooperatively to develop something that would be constructive and positive for mankind.

Mr. HALL. The Speaker even told him to write him letters, didn't he? Invited all the peasants to write to him.

Mr. BOEHLERT. He has had over 500 letters, as a matter of fact, from the Soviet Union.

Mr. HALL. And there is not so much cut out of them that we can't tell what they're asking. [Laughter]

Mr. BOEHLERT. I would like to know it for the record. Perhaps you can answer right now. Was this one man's decision as secretary? Was it a group decision? I would like to know for the record what kind of discussion you had on the potential for a transborder site.

Mr. DECKER. I will have to supply something for the record.

[The material referred to follows:]

TRANSBOUNDARY SITE—SSC

From the outset of discussions concerning the siting for the Superconducting Super Collider (SSC), it was decided that it should be located entirely within the United States.

The SSC is a U.S. initiative, and it is intended to be a watershed for America's scientific and technological leadership in the world. While it is desirable to pursue international cooperation to increase the scientific and technological resources available to the SSC and enhance research results, it is an American project and must remain inside the borders.

Secretary Herrington confirmed this in his January 30, 1987, press conference stating ". . . this project will be located in the United States. It is an American project and it will remain inside our borders."

Mr. BOEHLERT. Okay, thank you very much.

Thank you, Mr. Chairman.

Mr. HALL. One last question as a follow-up to an earlier question. Russia is kind of hustling nations to participate in their space station. Are they also hustling western partners in high energy physics?

Dr. DECKER. Not to my knowledge.

Mr. HALL. Not to your knowledge?

The Speaker and the Premier didn't discuss that over there, did they, while you were there?

Mr. BOEHLERT. Discuss—what's that, Mr. Chairman?

Mr. HALL. The fact that Russia is hustling nations to participate in their space program and whether or not they ought to also talk about the high energy physics program——

Mr. BOEHLERT. I don't recall the high energy physics. But specifically the Mars observer program was an area of discussion. You know we had the Apollo/Soyuz joint venture in 1975, and they are talking about 1990—in the 1990s the mission to Mars, a joint U.S./Soviet cooperative venture.

Mr. HALL. Mr. Chairman, I yield back the balance of my time. Thank you.

Mr. STALLINGS. Mr. Boehlert, do you have anything else you would like to raise at this point?

Mr. BOEHLERT. No.

Mr. STALLINGS. You've said it all.

Mr. BOEHLERT. I think I have stated my case. Thank you very much. [Laughter.]

Mr. HALL. Mr. Chairman, I would like to make a request that the young lady, Ms. Harris, from the Texas office report to the Chair here before she leaves if she is still here. Thank you.

Mr. STALLINGS. If there are no further questions, we appreciate the time and the testimony, gentlemen. We hope that it has been as worthwhile for you as it has been for us.

This meeting stands adjourned.

[Whereupon, at 2:57 p.m., the subcommittee was adjourned.]

APPENDIX

Department of Energy
Washington, DC 20585

July 14, 1987

Honorable Ralph M. Hall
Chairman
Subcommittee on International Scientific
Cooperation
Committee on Science, Space, and Technology
House of Representatives
Washington, D.C. 20515

Dear Mr. Hall:

On May 7, 1987, George J. Bradley, Jr., Principal Deputy Assistant Secretary for International Affairs and Energy Emergencies appeared before the Subcommittee on International Scientific Cooperation of the Committee on Science, Space, and Technology to discuss international cooperation in the Superconducting Super Collider.

Following the hearing, Mr. F. James Sensenbrenner, Jr., Ranking Minority Member, submitted written questions for our response to supplement the record. Enclosed are the answers to those questions which have also been sent to Mr. Sensenbrenner.

If you have any questions, please have your staff call Mark Waggoner or Tom Todd on 586-4277. They will be happy to assist you.

Sincerely,

for Robert G. Rabben
Assistant General Counsel
for Legislation

Enclosure

[illegible], CHAIRMAN
[illegible]
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General Counsel
M. THOMAS WEIMER
Republican Staff Director

May 9, 1987

Mr. George J. Bradley, Jr.
Principal Deputy Assistant Secretary
for International Affairs and Energy
U.S. Department of Energy
Washington, DC 20585

Dear Mr. Bradley:

Thank you for your excellent testimony before the Subcommittee on International Scientific Cooperation on May 7, 1987. Enclosed are additional questions that Republican Members of the Subcommittee would like you to answer, in order to supplement the record.

We would appreciate receiving your responses to these questions by June 5, 1987. If you have any questions regarding this request, please contact Mr. Todd Schultz of the Committee staff at (202) 226-3641.

Sincerely,

F. JAMES SENSENBRENNER, JR.
Ranking Republican Member

FJS:Sgs

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Hearings on International Cooperation
on the
Superconducting Super Collider (SSC)

May 7, 1987

Followup Questions Submitted by Republican Members

1. What is the role of the international science community in seeking international cost sharing for the SSC?

2. You state that through the working group and the senior group, you "are developing an action plan to obtain maximum participation from other countries." What is your schedule for completing this plan?

3. Which criteria are being use to select those nations that are or will be approached with regard to SSC cost-sharing.

4. On what basis might an offer of participation be refused? Will a review mechanism be established for this purpose?

5. Will foreign participation be allowed in the planning and design of the SSC, and if not, why not?

6. You note that it is important to be able "to project a domestic commitment to the SSC," and that you "are looking for an expression of Congressional intent in support of this project in order to move with reasonable confidence to secure commitments on the part of our potential partners." Please define what you consider to be such an expression of Congressional intent in support of the SSC that would give you such confidence.

7. What, if any, national security issues are involved in building the SSC as a trans-border project?

8. Who made the decision at DOE not to allow trans-border proposals for the SSC site selection process?

9. What percentage of SSC construction costs and operating costs does the DOE believe might be realistically shared by other countries? Please indicate over what time period our response is applicable.

Question 1: What is the role of the international science community in seeking international cost sharing for the SSC?

Answer: The international science community will assist in seeking international cost sharing for the SSC. They will develop and provide the information needed by their executive and legislative branches to evaluate the potential that the SSC offers to expand significantly the frontiers of human knowledge and to weigh the role their countries should play in this undertaking.

QUESTION 2: You state through the working group and the senior group, you "are developing an action plan to obtain maximum participation from other countries." What is your schedule for completing this plan?

Answer: Currently, we are gathering detailed information from key embassies around the world on the possible interests of their host governments in participating in the SSC. We will likely develop separate, individually tailored action plans. Our plan will be evolutionary, adjusting to the events and new information on a continual basis. We hope to have preliminary plans formulated by this Fall.

The majority of international arrangements should be completed by the time the SSC site is chosen and ground breaking begins. It is therefore important to begin soon what will be necessarily lengthy and complex negotiations. This will require not only planning, but a strong U.S. commitment to the project, including congressional support.

Question 3: Which criteria are being used to select those nations that are or will be approached with regard to SSC cost-sharing?

Answer: Selection of countries is based on strong national programs in high energy physics and informal expressions of interest in contributing to the SSC. Thus, for the time being, our focus is on Economic Summit Countries since we have had a long and fruitful collaborative relationship with these countries in the field of nigh energy physics. This does not however, preclude us from also seeking direct participation of other nations in the future or in considering unsolicited proposals as they might arise.

Question 4: On what basis might an offer of participation be refused? Will a review mechanism be established for this purpose?

Answer: Offers of participation must be compatible with the goals and technical requirements of the SSC project. Beyond this, there are no presently established criteria for rejection. Each offer will be carefully evaluated in a review mechanism to be established by DOE.

Question 5: Will foreign participation be allowed in the planning and design of the SSC, and if not, why?

Answer: Foreign participation of the Economic Summit member countries in preparation of the Conceptual Design Report (CDR) was invited formally as early as February 1985. In keeping with discussions among these countries over more than three years, the invitation encouraged early participation to assist them in determining what form of collaboration might best suit the future interests of their countries. Such participation did occur at the workshops and through membership on a wide variety of task forces and reviews, particularly in the review of the CDR. In addition, foreign scientists and engineers have participated in design activities as long-term visitors at the Central Design Group center at Berkeley, California. Scientist to scientist contacts have supported the invitation with encouragement of foreign participation in all stages of the SSC project.

Question 6: You note that it is important to be able "to project a domestic commitment to the SSC," and that you "are looking for an expression of Congressional intent in support of this project in order to move with reasonable confidence to secure commitments on the part of our potential partners." Please define what you consider to be such an expression of Congressional intent in support of the SSC that would give you such confidence.

Answer: Projection of a domestic commitment to the SSC is an indispensable element of a successful strategy to secure foreign participation in the project. Our allies have indicated from time to time a lack of confidence in the U.S. as a reliable international collaborative partner because our political and budget processes have failed to provide continuity and commitment for a number of collaborative projects in which they have participated with us in the past. Whether or not the facts justify this view, the perception of wavering U.S. commitments and changing ground rules and priorities is real.

In light of this, expression of Congressional intent in support of the SSC would help overcome a key uncertainty many foreign governments have concerning the program. We believe that the most important near term elements to bolster foreign confidence in our reliability would be a

timely Congressional commitment to the appropriation of funds to initiate line item construction activities in FY 1988, and explicit language that the DOE should proceed to negotiate with prospective foreign partners. This commitment would send a strong message to our potential collaborators that the SSC will be funded, will be built on schedule and has strong bipartisan support as a high scientific priority for the Nation.

Questions 7. What, if any, national security issues are involved in building the SSC as a trans-border project?

Answer: In light of our decision not to allow trans-border sites, no national security issues will arise. In general, with respect to our allies, we do not believe that there are national security issues associated with the SSC.

Question 8: Who made the decision at DOE not to allow trans-border proposals for the SSC site selection process?

Answer: From the outset of discussions concerning the siting for the Superconducting Super Collider (SSC), it was decided that it should be located entirely within the United States.

The SSC is a U.S. initiative, and it is intended to be a watershed for America's scientific and technological leadership in the world. While it is desirable to pursue international cooperation to increase the scientific and technological resources available to the SSC and enhance research results, it is an American project and must remain inside the borders.
Secretary Herrington confirmed this in his January 30, 1989 press conference stating, "...this project will be located in the United States. It is an American project and it will remain inside our borders".

Questions 9: What percentage of SSC construction costs and operating costs does the DOE believe might be realistically shared by other countries? Please indicate over what period our response is applicable.

Answer: The Secretary of Energy, John S. Herrington, has stated the intention of the Department to seek maximum cost-sharing funding from other countries. The Department of Energy has not yet established a specific goal. Once the support of Congress is gained, we will concentrate on learning the possible extent and timing of foreign cost sharing.

Proposals from other countries for participation in the SSC could take various forms. In the recent past, contributions to accelerator centers worldwide have included particle detectors, accelerator components and/or materials. In the case of particle detectors, they are often proposed by international teams of scientists and jointly funded by several countries. Sharing of operating costs is another possible form of contribution. Each proposal will be reviewed for its appropriateness for cost sharing.

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